

21
20ml

Firstly, in order to reset the charges in photo-electric conversion unit 101 are reset at t_1 , a reverse bias voltage V_{Hsub} is applied to N semiconductor substrate 107 as shown in ~~Figure 2~~, Figures 2, 8 and 9. Hereupon, the charges in photo-electric conversion unit 101 are swept out into N semiconductor substrate 107, because N semiconductor region 109 and P semiconductor region 108 become complete depletion layers.

Next, a voltage V_{Bsub} is applied to N semiconductor substrate 107 to start storing signal charges corresponding to the incident ~~light~~, light as shown in Figures 2 and 9, while surplus charges which can not be stored in photo-electric conversion unit 101 are excluded into N semiconductor substrate 107 by using vertical OFD for the blooming control.

Please rewrite the paragraph on page 8, lines 21-25 as follows:

2

Then, at the time t_3 , a voltage V_{Lsub} is applied to N semiconductor substrate 107 to raise up the potential barrier by $\Delta\phi$ of the vertical OFD for the signal ~~charges~~, charges as shown in Figures 2 and 9, whereby the leakage of the signal charges due to the self-induced drift, or the thermal diffusion is suppressed.

Please rewrite the paragraphs beginning on page 8, line 28, and ending on page 9 line 7, as follows:

2

As shown in Figure 6, ~~The~~ the decrease in the signal charges is improved to the negligible level for practical uses, when $\Delta\phi$ is greater than 0.4 V, although $\Delta\phi$ may be more preferably about 0.7 V taking an operation margin into consideration.

a2
read

The electric potential ϕ is preferably deeper than ϕ_{tg} which is given by the voltage V_{Mcl} which is applied, during the times except the read-out step, to second charge transfer electrode 106 in signal read-out portion 120 adjacent to photo-electric conversion unit ~~401~~.101 as shown in Figure 12.

Please rewrite the paragraph on page 9, lines 17-23, as follows:

a3

Then, at the time t_4 , signal charges, for example, such as signal charges 11,12,13,31,32,33,51,52,53 in photo-electric conversion unit 101 are read out into vertical charge transfer units 102 which transfer vertically the signal charges line by line into horizontal charge transfer unit ~~404~~.103 which transfers the signal charges horizontally to output them from output circuit ~~404~~. 104 as shown in Figure 7.

IN THE CLAIMS:

a4
out

1. (Original) A method for driving a solid-state image pickup device which stores, in a plurality of photo-electric conversion units, signal charges corresponding to an incident light during a prescribed time period, excludes surplus charges by an electric potential barrier, reads out, after cutting off said incident light by a cut-off means such as a mechanical shutter, said signal charges by grouping said photo-electric conversion units into a prescribed number of regions, and outputs image signal from all of the photo-electric conversion units by repeating the read-out procedures, which comprises the steps of:

cutting off said incident light;

raising up said electric potential barrier;

starting out said signal charges.